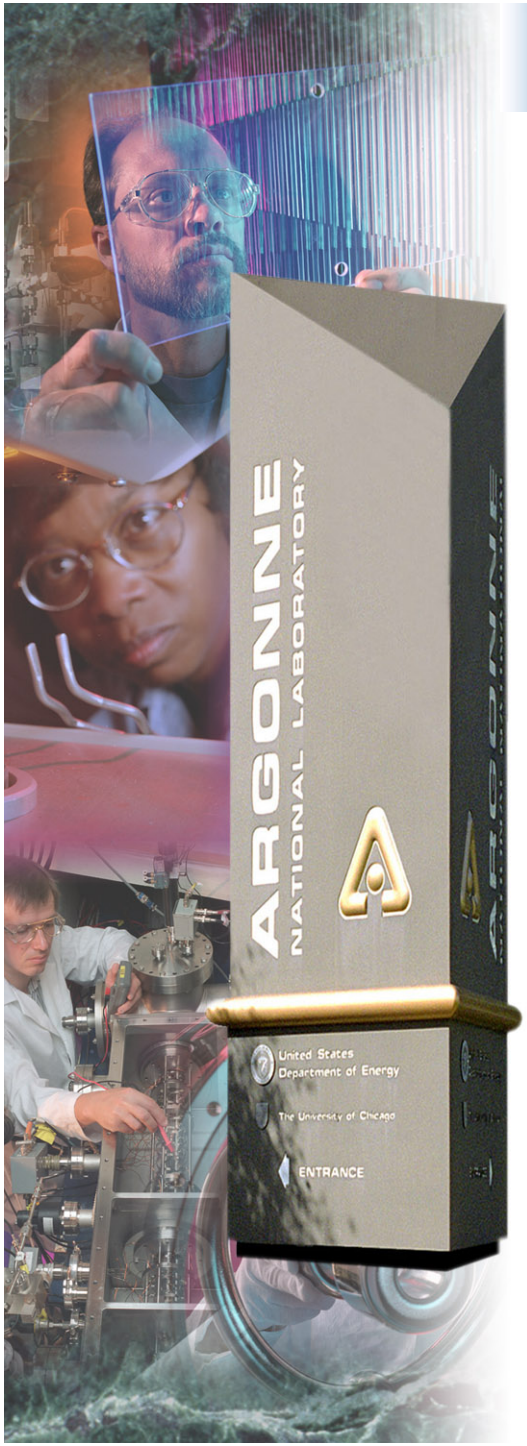

ARGONNE NATIONAL LABORATORY

Proposal Number **433**

Develop ControlLogic Based ACIS

Safety Interlocks Group

October 2005

THE UNIVERSITY OF CHICAGO

Office of Science
U.S. DEPARTMENT OF ENERGY

Argonne National Laboratory is managed by
The University of Chicago for the U.S. Department of Energy

Project: (ASD 433) Develop ControlLogic Based ACIS

Objective: This proposal is for the basic development of an Allen Bradley ControlLogix based PLC system to eventually replace the existing PLC-5 based ACISs. The design will incorporate two PLCs systems to enforce the safety logic and a supervisory system with a touch screen to monitor and display ACIS status. Funding includes procurement of the ControlLogix hardware and software, fabrication of a simulator / test stand, and evaluation of system configurations.

Background Information:

- New Initiative
- Single Year Funding
- High priority

Justification:
Existing system technology will eventually become obsolete – it is important to be ready to upgrade with minimum impact on operations.

Existing systems have hard-wired control panels that are already obsolete due to changes in the configuration of the ACISs.

Addition of the Linac's RF Gun Test Room and the building 420 RF Test Stand
Additions / deletions of ACIS Controlled Equipment
Changes in ACIS operation requirements (more complex interactions between systems)
Limited physical I/O capability – Storage Ring is nearly full. "Double duty" for some MCR components.

Requested Funds (FY06): $67.47 K (Operating)

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Cost:

FY	2006	2007	2008	Total
Noneffort	$67.47 K			$67.47 K
Existing Effort	$85.01 K			$85.01 K
New Effort				
Total	$152.48 K			$152.48 K

FY 2006 Effort:

Procure three ControlLogix systems, Panelview, software and licenses.

Fabricate the test stand.

Design system to “seamlessly” interface to the existing remote I/O base.

Evaluate design choices.

Layout an upgrade path with minimum impact on operations.

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Additional Benefits:

An ACIS with a third supervisory processor will allow:

Modifying operator displays / controls without affecting the safety logic including adding "up front" operator aids.

Removal of machine protection functions from the safety processors.

Better "engineering displays" to assist in maintenance and validations.

On-line supervisory monitoring of the safety PLC's critical devices to verify "like states". (Greatly increases reliability since devices are "tested" when exercised).

Consequence:

Upgrading will be necessary:

No immediate threat but equipment will eventually be obsolete.

Limited physical I/O space available. No room for significant expansion, particularly in the Main Control Room.

Existing systems are not intuitive to use – especially to new operators.

In the next 5 years there is approximately 4-5 weeks per year of shutdown time available to upgrade each ACIS's MCR PLC processor racks. Upgrades MUST be phased in – it is better be ready move when the time is available.

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